The Asian Longhorned Beetle

A Threat to Our Forests

The recent Asian Longhorned Beetle (ALB*; Anoplophora glabripennis*) detection in Worcester marks only the fourth infestation of its kind in the United States. What makes this infestation stand apart from its predecessors — to Bay Staters, anyway — is that it strikes all too close to home.

Unlike the more distant New York, New Jersey and Chicago infestations detected in earlier years, Worcester is not a faraway place. The trees being damaged by ALB here are local trees. The forests that ALB could potentially infest tomorrow are not 500 or 1,000 miles away, but just a short distance from where the beetle was first found in Worcester. Not only is the Worcester ALB infestation already affecting local trees with very real consequences, it has the potential of spreading to nearby forests in Massachusetts, and beyond, if left unchecked.

Scientists and forest health managers are attempting to pin down where, when, and how the insect first arrived in Worcester, though some of those details might never be known. What is known is that the prospect for eradication of the ALB locally will take years. A timetable for eradication will be better understood upon completion of delimiting surveys to determine the scope of the Massachusetts infestation.

The ALB is estimated to have arrived in the United States sometime in the 1980s, likely coming directly from Asia as a stow-away in solid wood packing material. ALB was first detected infesting trees in 1996 in Brooklyn, NY. It has since been found in Manhattan, Queens, Staten Island, an uninhabited island off Staten Island in New York City, and on Long Island, NY.

In 1998, the insect was detected in Chicago, IL. That infestation was declared eradicated in April 2008. In 2002, ALB was found in Jersey City, NJ. Another infestation was later detected in New Jersey's

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An enlarged view of the Asian Longhorned Beetle shows details of this destructive pest that has been found south of the Wachusett Reservoir. Aggressive measures are being undertaken to stop the spread of this invasive species, which could cause widespread harm to the region's trees and forests.

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In This Issue:

The recent discovery of the Asian Longhorned Beetle in Worcester is a serious threat to the ecosystem, and economics, of the region. This issue of *Downstream* focuses on how federal, state, and local governmental agencies are responding to this latest invasive species found in central Massachusetts.

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Department of Conservation and Recreation
Division of Water Supply Protection
www.mass.gov/dcr/waterSupply.htm

Constructing Quabbin

Efforts to Preserve Documentation of the Past

A 1946 still image of water passing over the spillway at the newly completed Quabbin Reservoir. Quabbin Visitors Center

As part of its function to construct Quabbin Reservoir, Dam, and Aqueduct, the Metropolitan District Water Supply Commission (MDWSC) Engineering Department began taking motion pictures in the 1930s to document the construction work. The MDWSC's filming was partly inspired by the exhibit it was planning with the Metropolitan District Commission (MDC) for the September 1930 Tercentenary Exposition of the founding of Massachusetts, which would feature exhibits from state agencies.

According to the 1930 MDWSC Annual Report, "The Commission also took and exhibited motion pictures of its construction work and of other activities of the Metropolitan District Commission. Members of the engineering force were present to show the pictures and explain the exhibits."

The MDWSC likely showed three films at the Tercentenary Exposition: "How Boston Gets its Water Supply" (15 minutes); "Construction Work, Shaft 8 – Shaft 1" (10 minutes); and "Mixing Concrete for Tunnel Lining" (15 minutes).

The filming was assigned to engineer Albert S. Genaske (1898-1990), who was appointed to the MDWSC in the agency's first months of existence in 1926. Beginning in 1930, and continuing for the next twenty-five years, Genaske took and edited most of the MDWSC and MDC motion pictures. Genaske retired from the MDC in 1967.

Tercentenary Exposition of Governmental Activities of the Commonwealth of Massachusetts, 1930, Print No. 153, Photograph by Paul E. Genereux . DCR Archives

While the MDWSC shot film footage of mostly construction work, there was some effort to document the towns on film. Much of this film, however, is missing from the collection. The MDWSC had various reels with such titles as "Quabbin Reservoir Project: Views in the Valley (10 minutes)"; "Historical Quabbin (25 minutes)"; "Swift River Reservoir Project – Views in the Valley"; and "Swift River Valley in Color." DCR continues to search for these films.

While portions of the MDWSC/MDC film collection were transferred to VHS in the mid-1980s, it was not until 2006 that the opportunity arose to preserve and transfer the entire collection. The Association of Moving Image Archivists and the National Film Preservation Foundation can be credited with educating archivists on how to properly preserve and make accessible motion picture film. The Foundation's 2004 *Film Preservation Guide: The Basics for Archives, Libraries, and Museums* guided this initiative.

Over time, the natural shrinkage and brittleness of film make motion picture film unable to be projected. Through the fall of 2005 and winter of 2006, the beginning frames of each reel of film (105 reels of various lengths) were manually reviewed over a light table and through a magnifying loop. From this work, a preliminary inventory and organization of the films, film stock identification, and other characteristics of the films were compiled.

There are basically two levels of archival film preservation: mid-grade and high-grade. A low-grade is generally used at the retail level for personal home movies (done at a quality lab, the results are good for home movies, and a mini-master should be provided). The high-level grade is a master onto new 35mm film stock (very expensive; no lab in MA can do this work). The DCR Archives selected a mid-grade level, where the film is transferred to an analog master on broadcast-rated magnetic tape.

The Bell & Howell Filmo Model 129B 16mm projector purchased by the MDWSC in 1935; photographed by the MDC Archives in 1994. DCR Archives

While the procurement process for professional film transfer work was complicated, quality vendors were fortunately identified. One vendor provided the master tape stock, a second vendor provided the duplication service to make the DVD copies, and a third vendor undertook the film inspection, cleaning, splice repair, tonal/color correction, and transfer work. Archival

FILM PRESERVATION - SEE PAGE 6

Payments in Lieu of Taxes

An Overview of the DCR PILOT Program

Massachusetts General Laws c. 59, §5G mandates that DCR's Division of Water Supply Protection make Payments in Lieu of Taxes (PILOT) on the 100,000 acres of Commonwealth property managed by the Office of Watershed Management. The current law was ratified in 1984 for the Quabbin Reservoir and Ware River Watersheds and was amended in 1987 to include communities in the Wachusett and Sudbury Reservoir Watersheds.

The base information used for determining DCR PILOT, as with all other State Owned Land PILOT, is the valuation performed every four years by the Department of Revenue (DOR); the next revaluation is scheduled for 2009. It is strictly DOR's responsibility to set the value for this land following their guidelines on segmenting lands into prime lots (the requisite frontage and area needed to build a single family home in each community), rear acreage and unbuildable acreage, along with discount adjustments for total number of prime lots and total acreage.

There are, however, several differences between the DCR PILOT and other State Owned Land reimbursements that are

PILOT PROGRAM - SEE PAGE 6

Reservoir Watch - Wachusett Reservoir Crest Gate Project

Under an MWRA Capital Improvement Project, a 100 ft. long, 6 ft. high bottom-hinged crest gate was installed at the Wachusett Reservoir to replace the 100 year old stoplog system of spillway control. The crest gate was designed to operate across a reservoir elevation range of 390 ft to 395 ft., which is the top of the adjacent masonry upper spillway. The gate offers better and safer control options for reservoir operators. The crest gate project also included the construction of an auxiliary spillway.

Combined, these improvements satisfy current state of design requirements for passing a Probable Maximum Flood (PMF) while protecting the main Wachusett Dam. The PMF is a theoretical situation resulting from a Probable Maximum Precipitation (or PMP) event of 28 inches of rainfall on the reservoir watershed over a 72 hour storm period. This is not a likely occurrence, but current regulations for dam and downstream safety require a design to this standard.

New hydraulically operated crest gates at the Wachusett Dam are shown above in the "up" position. Shown below in the "down" position the new crest gates can allow spillway flows of up to 600 million gallons of water per day.

The peak inflow of water to the reservoir from this storm is calculated at about 82,000 cubic feet per second (cfs). After routing through the reservoir, the peak outflow of water through the new spillway improvements is 62,000 cfs.

Dry and wet testing of the crest gate occurred over the summer. It will be officially accepted once MWRA is satisfied that all components of the crest gate project have been addressed and appropriate staff have been trained in operation of the gate. The project also included structural enhancements to the Wachusett Reservoir North Dike and restoration of public access paths through the spillway area. Final site landscaping is currently underway.

- John Gregoire, MWRA
Program Manager, Reservoir Operations

Reservoir Levels and 6-month Precipitation

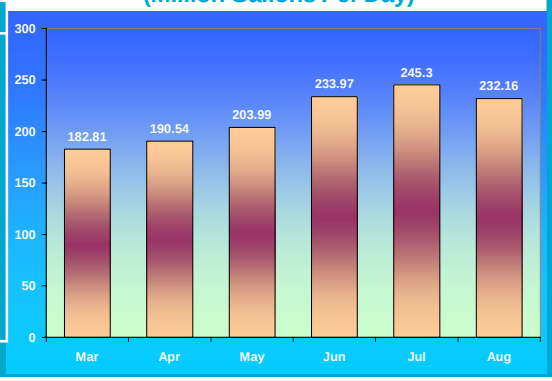
(March 2008 to August 2008)

Reservoir	Quabbin	Wachusett
Minimum*	526.76'	389.16'
Percent Full	94.0%	88.2%
Date	3/1/08	5/12/08
Maximum*	530.10'	394.99'
Percent Full	100.2%	100.0%
Date	5/4/08	3/12/08
Precipitation	29.58"	19.57"
Seasonal Avg.	24.88"	23.16"

*Reservoir Depth in Feet Above Mean Sea Level

Data and photos provided by MWRA

2008 System-wide 6-Month Water Usage (Million Gallons Per Day)



Life Cycle and Identification of the Asian Longhorned Beetle

The Adult Asian Longhorned Beetle (Image 1) measures about 3/4 to 1 1/2 inches in length and has a shiny black shell with numerous white to yellow spots. The beetle

chews out round pits in the bark of host trees where it lays a single egg (Image 2). During summer, sap may flow from the egg site as the larve feeds inside the tree (pointed out in Image 3).

Another indication of beetle activity is the accumulation of coarse wood dust, created by the boring of the beetle larve, around the base or on branches of the infested tree (Image 4).

As the larve matures into the adult form (Image 5) it bores its way out of the tree and leaves behind a hole about 3/8 inches in diameter (Image 6). Resulting damage to the host tree is very likely fatal. This cycle repeats every 12 - 18 months; in a few short years the infestation can leave wide-spread devastation.

USDA Forest Service Photos

ASIAN LONGHORNED BEETLE - FROM PAGE 1

Middlesex/Union Counties in 2004. Forest health officials subsequently declared the Jersey City infestation eradicated in April 2008. ALB was also found in Toronto, Canada, in 2003.

The anticipated ALB eradication date for New York is 2034 and 2015 for New Jersey's Middlesex/Union Counties. More than 40,000 trees have been removed from the infested areas to date. It is important to note these eradications came only after considerable cost, not only in dollars, but in years of planning, research, multi-agency coordination, hard work, and tough decisions. According to the US Dept. of Agriculture Animal and Plant Health Inspection Service (APHIS), damage from infestations in New York, Illinois, and New Jersey resulted in the removal of thousands of trees. Costs to state and federal governments since its initial discovery in 1996 is in excess of $168 million. ALB has the potential to wreak havoc nationwide, affecting lumber, maple syrup, nursery, and tourism industries and accumulating more than $41 billion in losses.

Adult ALB are ¾ –1½ inches long. They are shiny black in color with irregular white spots on their backs. Asian longhorned beetles also have black and white alternating bands of color on their antennae. Their antennae are quite long, about 1½ – 2½ times the lengths of their bodies.

ALB damage disrupts the flow of nutrients and water to a tree, eventually killing it. Heavy infestations can kill a tree in one to two years, though seven to 10 years is more common.

On their own, ALB spread very slowly. The natural spread of ALB is greatly supplemented by human-aided movement, such as through yard waste, firewood and logs. The insect is a native of China and Korea. There are no known native predators or parasitoids of the ALB. Unlike many other invasive species, it is considered a serious pest in its native range. In China, the beetle's favored tree is the poplar, which was often planted in rows as a windbreak.

State and Federal agencies are working together to stem the threat. Here, an inspector assesses damage in a Worcester neighborhood.

USDA Photo

The Worcester detection, reported August 1, 2008, by a concerned resident, was a troubling discovery. ALB is one of the most destructive invasive insects in the country today. Unlike the similarly destructive emerald ash borer that only infests and kills ash trees, the ALB infests a wide variety of hardwoods, many of which are found in nearby forests. If left unchecked, ALB poses a serious threat to our urban and rural hardwood forests in North America.

ALB host species include maple, willow, elm, ash, poplar, birch, horsechestnut and others. Worcester ALB program managers plan to remove infested and selected high risk trees. Remaining host trees will be treated with the insecticide imidacloprid by trunk or soil injections. This practice has been successful in limiting tree loss from the beetle. If the Worcester ALB infestation does spread outside the city area to forested areas, there will be an ample and diverse variety of suitable host trees awaiting them.

"The bad news is that ALB has one of the most diverse ranges of hardwood host trees for an invasive insect," said Massachusetts Dept. of Conservation and Recreation Forest Health Program Leader Charlie Burnham. "The good news is early detection means the impact to forest resources could be reduced."

Citing the potential for widespread forest damage throughout New England, state forest health managers in New Hampshire, Vermont, Rhode Island and Connecticut are making public pleas for support. They are asking for the public's cooperation in keeping an eye out for the insect and to report it when they find suspect beetles. So far, no ALB have been spotted in New England states surrounding Massachusetts.

"The more eyes we have looking for one of these invasives, the better chance we have of early detection allowing us the possibility of containing or eradicating the problem," Burnham added. Landowners and residents in Massachusetts are urged to keep an eye out for the ALB and report any suspected finds to 1-866-702-9938. See the sidebar on page 7 for websites and other sources of information on the Asian Longhorned Beetle.

- Glenn Rosenholm, USDA Forest Service, Northeastern Area
Adapted from State and Private Forestry Release No. DFO-14-08

These two images show the actual size of the adult male (at left) and female (at right) Asian Longhorned Beetle. Typically they will measure between 3/4 to 1 1/4 inches long and the male is distinguished by long antennae. Both are shiny black with random white spots that may also have bluish or yellowish tinges.

USDA Photo

DCR Cooperates in ALB Eradication Efforts

Since the ALB was first detected in Worcester in August 2008, there has been a tremendous effort to survey, identify, and control the infestation. The Massachusetts Cooperative Asian Longhorned Beetle Eradication Project is a coordinated effort by federal, state, and local agencies: The USDA Animal and Plant Health Inspection Service (APHIS) is coordinating this effort and providing 18 staff; DCR is contributing 11 people; and the City of Worcester is providing four people. The US Forest Service and the MA Department of Agricultural Resources are also part of this team.

Events change weekly. As of October 4, 2008, survey crews have been sent into four areas of Worcester. Close to 5,000 trees have been surveyed; 1,447 infested trees have been identified, all in Worcester except one in West Boylston. 91% of the surveys have been conducted from the ground; 441 trees were either climbed or surveyed from a bucket truck. An infested tree from Ararat Street was removed in September; sections of the tree are being tested in hopes of determining exactly when the tree first became infested. Local newspapers and the internet (see page 7) are the best sources for up-to-minute information.

DCR's Division of Water Supply Protection (DWSP) is acutely aware of the threat posed by ALB. DWSP is the manager of 900 acres of land within the quarantine area, and over 90,000 acres of adjacent forest, encompassing the Wachusett Reservoir, Ware River, and Quabbin Reservoir watersheds, that contains a significant amount of the ALB's preferred host species. DWSP is taking the following steps in response to this risk:
1) Temporarlily suspending all forestry operations in the quarantine area.
2) Training staff in early detection of ALB.
3) Utilizing daily presence in the watershed system's forests to look for the presence of ALB. 4) Assigning two staff to the ALB Eradication Project.

The goal of DWSP's land management strategy is to provide a multi-age forest cover that maintains the quantity and quality of a world renowned, unfiltered drinking water supply. Keeping ALB from spreading into the watershed system's forests is an agency priority.

- Dan Clark, DCR/DWSP Natural Resources Director

PILOT PROGRAM - FROM PAGE 3

made by the Commonwealth under MGL c. 58, §§13-17:

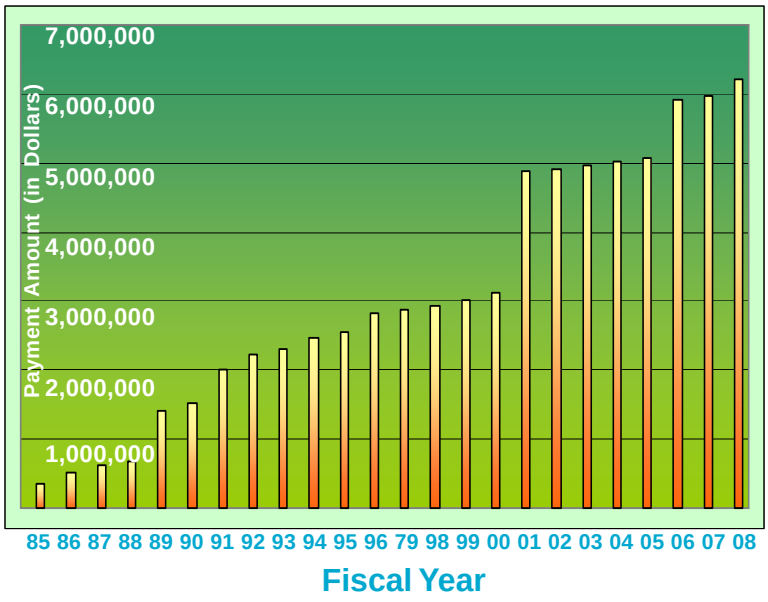
1. MWRA ratepayers pay the bill.
Funds for the DCR PILOT payments come from Massachusetts Water Resources Authority (MWRA) rate payers who use the reservoir waters; the MWRA provides funding to the DCR to make PILOT payments to the watershed towns. Unlike other PILOT programs for state-owned lands, which are disbursed through the State's Local Aid program ("Cherry Sheets") and are subject to legislative appropriation (75% of full value in FY2008), the DCR program is paid in full directly to each community. The DCR payment does not appear on the Cherry Sheet.

2. DCR PILOT utilizes the local commercial tax rate.
The PILOT which is distributed through the "Cherry Sheet" is based on a state-wide average of residential tax rates calculated by DOR. DCR PILOT is required to utilize each community's commercial tax rate in calculating the PILOT obligation.

3. The payment can never be less than the previous year.
MGL c. 59, §5G states that Watershed Management PILOT can never be less than the previous year's payment. This "hold harmless" clause provides the watershed communities the security of level funding even if a drop in valuation or tax rate combines to lower the calculated PILOT. This requirement provided watershed communities close to $1 million in FY2008.

Since 1985, over $74 million has been distributed in watershed protection PILOT payments (see bar chart). Fiscal Year 2008 PILOT was $6.2 million, representing a 23% increase from the amount prior to the last revaluation in 2005. This increase takes into account land acquisition as well as changes in land values. Ten active supply communities now receive $250,000 or more from DCR (see table). DCR will be working closely with DOR and the watershed communities on the 2009 revaluation, which will take effect in FY2010. For complete PILOT listing of each watershed community, go to www.mass.gov/dcr/waterSupply/watershed/pilot.htm.

- Joel Zimmerman - DCR/DWSP Planner



Community	Fiscal Year 2008 PILOT
Holden	$710,155
West Boylston	$569,752
Boylston	$500,000
Sterling	$489,630
Petersham	$380,147
New Salem	$353,126
Rutland	$329,798
Ware	$320,224
Shutesbury	$250,019
Hubbardston	$249,984

The average PILOT per acre varies considerably across the Watershed System. Factors involved in creating this scenario include:

1. Land values are significantly higher closer to Boston.
2. PILOT is calculated using each community's tax rate.
3. The number of higher value prime lots is dependent on the amount of frontage owned by DCR in a particular community.
4. DOR's land and segmentation discount schedule more prominently affects towns in which DCR owns large blocks of property.
5. The towns of Belchertown, Hardwick, New Salem, Pelham, and Ware receive a separate payment for lands annexed after the disincorporation of Dana, Greenwich, Enfield, and Prescott.

FILM PRESERVATION - FROM PAGE 2

film cans were purchased from an archival supplier to rehouse the original films. The film transfer work by the vendors was completed in June 2006 (Fiscal Year 2006). In total, $11,300 was spent on the transfer work and $371 on the archival film cans.

Throughout FY07, each film on the DVD access copies was reviewed, the length timed, and developed shot lists. The MDCWSC/MDC Annual Reports and other MDC records were consulted to identify specific scenes and dates. The complete shot list runs 61 pages. The approximately 30,000 linear feet of film equated into approximately 16 hours of film.

DVD copies of the films have been distributed to specific DCR offices where staff are utilizing film scenes in larger public presentations. The films are also available to film producers making documentaries.

- Sean Fisher - DCR Archivist
DCR Archives is a section in the Bureau of Planning & Resource Protection, Office of Cultural Resources.

For More Information About Asian Longhorned Beetles

Check out these websites:

US National Forest Service: ***www.na.fs.fed.us/pubs/palerts/alb/alb_pa.pdf***

US Department of Agriculture, Animal and Plant Health Inspectional Service: ***www.aphis.usda.gov/plant_health/plant_pest_info/asian_lhb/index.shtml***

MA Dept. of Agricultural Resources and UMass Extension: ***http://massnrc.org/pests/alb/***

Worcester Telegram and Gazette: ***www.telegram.com/apps/pbcs.dll/section?Category=BEETLES***

City of Worcester: ***www.ci.worcester.ma.us/cmo/beetles.htm***

Universtiy of Vermont: ***www.uvm.edu/albeetle***

or these books:

National Audubon Field Guide to North American Insects & Spiders. Alfred A. Knopf, New York, 1998.

Beetles, A Peterson Field Guide. Richard E. White, Houghton, Mifflin Co. 1983.

Landscapers Guide to the ALB and its Host Trees. Pamphlet available from Charlie Burnham, MA State Forester at (413) 253 -1798 ex.204

To report an infestation call the ALB Hotline: (617) 626-1779 or (866) 702-9938

And Another Thing...

by J. Taylor

Kids Corner

Insects -
The Good, the Bad & the Bugly

Over time humans have found insects both beneficial and destructive. This activity will help you learn about various insects and their positive and negative impacts on us.

Materials: Index cards or paper, pen, insect list, resource materials or internet

Procedure: Below is a list of insects with some of the ways they have interacted with humans over the years. Write each insect name on an index card or slip of paper and place them in a container. Have each member of your family that is interested in participating select a card from the container. The members can then use a variety of resources, such as the books around the house, the library or the internet, to find out about the effects – good, bad or both – that their particular insect has had on people.

The following ideas and questions can be used when sharing the information about each person or group's insect:

- Does the insect have the same impact, positive or negative, on us today that it has had in the past? Why or why not?
- How might the insect's role in human society change in the future?
- How does the insect affect animals or plants?
- In what ways would the world be different if the insect had never existed?

List of Insects:

- Fruit Fly (use in genetic research, Mediterranean fruit fly attacks crops)
- Gypsy Moth (attacks trees during outbreaks, spraying controversy)
- Honey Bee (produces honey & wax, pollinator, allergy to sting, killer bee scare)
- Ants (household pests, fire ant expanding range)
- Mosquitoes (malaria, yellow fever, dog heartworm)
- Ladybug Beetles (used as a biological control, household pests)
- Fleas (historic outbreaks of disease – bubonic plague, pest on pets)
- Silkworm Moths (production of silk)
- Butterflies (beauty, enjoyable to observe, art subject)
- Flour Beetles (eats grains, serious pest in flour mills, household pest)
- Grasshoppers/Locusts (food for birds & mammals, historical crop destruction)
- Woolly Adelgid (attacks hemlock trees)

- Jim Lafley - DCR/DWSP Wachusett Education Coordinator

Support Land and Water Conservation

The Massachusetts Environmental Trust is launching a new "Land and Water Conservation" license plate that will support the conservation of land critical to the protection of the Commonwealth's water resources. Similar plates in other states have conserved tens of thousands of acres in recent years. This new land conservation tool is needed more than ever.

For more information and to reserve your plate, go to www.MassLandAndWater.info.

Development near our lakes, ponds, rivers and coasts - and the fertilizer, storm water run-off and other non-point source pollution it brings - is the greatest single threat to Massachusetts waters.

Conservation and protection of supporting land is the most effective strategy for protecting the region's water quality, fish, and other rare aquatic species and habitat. Protecting buffers along our rivers, lakes, and ponds is essential to keep these waters clean for drinking water, recreation and wildlife.

Proceeds from the new Land and Water Conservation license plate will be segregated in a separate fund dedicated to the acquisition, stewardship and restoration of land affecting 9,000 miles of streams and rivers, 1,100 lakes and ponds and over 1,500 miles of coastline - of which many thousands of acres are unprotected. By purchasing this plate, you help protect core terrestrial and wetlands habitat and other priority watershed areas.

The Massachusetts Environmental Trust protects the lakes, rivers and coastal waters of Massachusetts. Proceeds from the Trust's Right Whale, Brook Trout and Blackstone Valley Mill plates have funded over $16 million in water protection initiatives throughout the Commonwealth.

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Downstream is produced twice a year by the Massachusetts Department of Conservation and Recreation, Division of Water Supply Protection. It includes articles of interest to residents of the watershed system communities. Our goal is to inform the public about watershed protection issues and activities, provide a conduit for public input, and promote environmentally responsible land management practices.

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